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TECHNOLOGY AND ADAPTATION IN YORUBA INDIGO DYEING

RAZAQ OLATUNDE ROM KALILU & MARGARET OLUGBEMISOLA AREO

Department of Fine and Applied Arts, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

ABSTRACT

Dyes extraction from natural plant sources is widely practiced in Yorubaland. Indigo however remains one of the oldest, most popular, most widely used and for which the Yoruba are renowned. Advancement in technology, external influences and introduction of synthetic dyes into indigo dyeing has fostered continuity between indigo technologies of the past and its contemporary practice. Scholastic reticence however exists on the technological adaptations that has sustained indigo dye extraction. This art historical account, based on field researches conducted between November 1982 and March 2015, examined the technology of Yoruba indigo dyeing from the earliest known period up to 2015. Thus, the morphology of the plant, the extraction and chemistry of the dye, traditions and adaptations in the practice were looked into. This was with a view to determining changes and adaptations of the technology and the techniques in the artistic practice. Findings indicate observable paradigm shifts in material, tools and equipment and consequently technology and techniques of indigo dyeing. There were also paradigm shifts in the apprenticeship pattern and the genders of practitioners. Through their dynamism, the Yoruba dyers have continued to keep indigo dye and dyeing alive and have kept themselves economically responsible, thus continuing to contribute significantly to the technological development to their communities.

KEYWORDS: Yoruba, Indigo, Dyeing, Technology, Adaptation

INTRODUCTION

Man has for years been fascinated by colouring matters known as dye. Dyes are “substances that can be used to impart colour to other materials, such as textiles, foodstuffs and paper.(Davison, 2001). They are technically “any of a class of intensely coloured complex organic compounds used to colour textiles, leather, paper and other materials.(Encyclopedia Britannica, 2001). Evidence from Egypt revealed that cloths were dyed over 5000 years ago in ancient Egypt (Abrahart, 2014), which civilization thrived around 3000 BC (Brier). Archaeological evidences in India and the Middle East show that dyeing has been practiced for over 5000 years. Similarly, the earliest written record of use of the dye in China is dated 2600 BC, almost 5000 years old. Also by 715BC, wool dyeing was an established craft in Rome (Drudging, 2006). Archaeological evidence and the radio carbon dates confirmed the existence of patterned cloth dyeing in West Africa sub-region as of the eleventh century AD (Bolland, 1992).

Before the development of synthetic dyes in the mid-nineteenth century, dyes were for thousands of years extracted from natural sources such as plants, animals and minerals. For example, madder was obtained from *rubia tinctorium*, a perennial herb which produces shades of red, pink, purple and brown. Modern discoveries have shown that Egyptian mummies were wrapped in cloth dyed with madder (Erin). Other plant dyes are Alizarin (extracted from madder), Catechu *(senegalia)*, Logwood *(haematoxylum campechianum)* and Indigo *(indigofera tinctoria)*. Animals also yielded dyes such as cochineal, kermes and especially Tyrian purple which was important in Roman history. The Tyrian purple for example was derived from a Mediterranean mollusk, thousands of which were required in the extraction to dye the robes of

the emperors to the famous Tyrian purple. Some minerals such as Ochre and Prussian blue also yielded dyes (Wikipedia, 2014). The greatest source of dyes is nonetheless from the roots, leaves, barks, flowers and fruits of plant. Of the natural dyestuffs, indigo is the oldest one indicated on the records of world textile tradition (Proctor and Lew, 1992;33), which use is believed to predate the time of Moses (Gillow and Sentence, 2009). Indigo is also by far the most favourite (Polakoff, 1982;24), popular and widely used dye in traditional (Picton and Mark, 1979;37), and pre-1960 Africa.

Dyeing with indigenous plants as a vocation and art is practiced among the Yoruba, whose homeland is the Southwestern Nigeria and parts of Kwara, Kogi, Edo and Delta States of Nigeria as well as parts of the Republics of Benin and Togo. Indigo dye has however indisputably remained the most versatile of all the natural dyes found among the people. Aside from indigo dye being used on its own, it is required to obtain a range of other colours which ordinarily would not have been obtainable from nature. The importance of indigo dyeing in ancient Yorubaland is demonstrated in the ubiquitousness of the practice almost everywhere, even in the smallest Yoruba villages (Eluyemi, 1978;31). Indigo dye consequently remains the commonest, the most popular and the most extensively used compared to other natural dyes and colours. Up to the time of the introduction of synthetic dyes in the 1960s, natural dyes especially indigo, was the only dye used by the Yoruba dyers and *Adire* artists.

According to Balrour-Paul, studies by Boser-Sarivaxevanis, indicate that West Africa is one of the greatest centres and "one of the most original" in the development of indigo worldwide. Balrour-Paul suggests that since indigo dyeing often is inseparable from cotton production, knowledge about and development of the art probably spread from three main centres namely: the old Ghana Empire of Upper Senegal, which collapsed in the Eleventh century AD, the Northern Hausa region of Nigeria; and among the Yoruba of the Southwestern region of Nigeria (Balfour, 2011;26). Beier (1993;1) in his case also suggests that the development of indigo probably took place in three places: Senegal, Sudan and among the Yoruba of Southwestern Nigeria. Kalilu's work on Old Oyo, the most northerly of the Yoruba kingdoms shows that cloth dyeing was a large and thriving art and business and that the kingdom, and eventually the empire which it built, actively participated in the trans-Saharan trade and exported its arts across West Africa and beyond through trade, military activities and political dominance of its neighbours (Kalilu, 1992). Furthermore, Areo and Kalilu have argued and justified a local origin for indigo dyeing and Adire, the tie and dye textile art among the Yoruba (Areo and Kalilu, 2013).

The Yoruba are still considered the "most passionate lovers of indigo" in West Africa (Balfour, 2011;26). This may be partly because of the level of availability of indigo plant in their homeland, and partly because of the different levels of distribution of the dyeing skill. For instance, Osogbo, a Yoruba town is renowned as the home of indigo, *Osogbo ilu aro.* As a commodity indigo balls and indigo dyed fabrics produced a substantial income for the women indigo dyers of southwestern Nigeria. It is on record that at the zenith of its commercial vibrancy in 1920s, 200,000 indigo dyed wrappers were being sold to Senegalese merchants daily by women dyers in the Yoruba town of Abeokuta in Nigeria (Bayfield, 1993), and by 1932 sales of these wrappers had risen to an estimated 500,000 (Egba, 1932;90). Indigo dyeing in the Yoruba town of Osogbo was also so viable that at the peak of the demand for indigo-dyed fabric for export in the early 1920s, many textile artists from Abeokuta, had to take their cloth to Osogbo for dyeing, while its neighbouring Yoruba town of Ede supplied Abeokuta dyers with indigo balls, *elu* (Akinwumi, 2008;190). Daniel (1938) observes in the 1930 that almost half of the population of Yorubaland was as at then involved in the art of indigo dyeing with over 200, 000 pounds worth of cloth being dyed annually. Daniel observes further that, although there were numerous dyeing centres, Abeokuta, with a thriving export trade to other African countries, was the most famous of the centres, and was regarded as

"the Paris of Yorubaland". In fact, in Abeokuta alone, about 80 per cent of the populace was at a period engaged in the production of indigo- dyed textiles (Negri, 1966).

Generally, Osogbo, Ede, Ibadan and Abeokuta were indisputably the hubs of the centres of Indigo and Adire production of international economic and artistic significance of the nineteenth through the mid-twentieth century. Interestingly however, as important as indigo dye is in the economic life of the Yoruba, its production is rapidly dying out and a large number of the hitherto indigo production centres are either extinct of no longer active. For instance at Osogbo and Ede towns, only one traditional dyeing centre each is extant, respectively at the Aka and Akoda family dyeing centres (Areo, 2010).

The reasons for the decline of indigo dye production and indigo dyeing are not farfetched. Four factors are directly attributable for this. Firstly is the process of indigo dye extraction which is tedious and takes a couple of weeks to complete. This is a significant discouragement in a jet age which is bedeviled particularly in Nigeria with a "get rich quick syndrome". Secondly, many of the young girls who normally would have learnt this hereditary art from their mothers through the traditional apprenticeship prefer Western education and the subsequent white collar jobs that Western education offers. The apprenticeship in indigo dyeing is however combinable with formal schooling as a few number of people had done in other crafts. But the nature of indigo production and dyeing, and the consequent low economic end point discourage such combination in the craft. Be that as it may, the third reason is the fact of the Yoruba markets that are daily assaulted with frippery of foreign clothings and textile materials imported into Nigeria and which often times are more colourful and cheaper. Finally, Yorubaland is not left out of the globalization of the human societies and its attendant rapid access to information through different social media, acculturation of foreign values, access to imported goods and foreign tastes in fabrics and fashion.

Many writings exist on indigo dye. The earliest of such literature materials is by a Scotman, Mungo Park (Park, 1799;281), a pioneer of exploration in West Africa, who in his 1799 memoirs records seeing women spinning, men weaving the spun yarn on narrow looms and the woven fabric being dyed in indigo to a rich and fast colour with a high gloss. Stanfield (1971), whose account was also repeated by Mack and Picton (1979), recorded the technique of indigo dye extraction among the Yoruba. Also Oke (1971), traces the general history of dyeing, and present an overview of the traditional techniques of indigo dye extraction and suggestions as a chemist, on ways to reduce the production time and increasing the colour fastness.

Gillow and Sentence (1999; 120), in their own cases give detailed account of the extraction process, preparation of the ashes or lye used in indigo extraction. Polakoff (1982;24) also gave a brief overview of the extraction technique.

Passage of time and changes in the technology and techniques of indigo production and dyeing among the Yoruba since the previous studies on the Yoruba indigo were made over the last century are significant problems that have created knowledge gap in this regard. Furthermore, there are the problems of consuming indigo dye extraction process, globalization and access to white collar jobs all of which severally negatively impacted to reduce the number of practitioners, centres and vibrancy of the artistic practice. Against this background, this study examines the technology of Yoruba indigo dyeing from the earliest known period up to 2015. This is done with a view to determining changes and adaptations of the technology and the techniques in the artistic practice. The study has been based on the authors' direct field researches conducted between November 1982 and March 2015.

INDIGO: MORPHOLOGY OF THE PLANT AND EXTRACTION AND CHEMISTRY OF THE DYE

Dyeing in indigo is a specialized art which has become a legacy of the Yoruba women. Its preparation is a specialist activity. It is also solely women's activity or hereditary vocation passed from mothers to daughters within the family. Indigo dyeing of cloth among the Yoruba is of two different classes: the total-dyed cloth, *aso alaro,* in which the whole fabric is immersed and dyed completely in indigo; and the other class, *Adire,* which involves creating patterns on the fabric through any of a variety of available techniques before immersing the cloth inside dye.

The raw material and source of indigo dye are the many varieties of genus *indigofera,* the third largest in the family Leguminosae which consists of almost eight hundred species, that are sometimes cultivated, but which often times grow wild throughout Nigeria. Of these varieties are: *indigofera arrecta,* called *elu aja; indigofera suffricotosa;* and *lonchocarpus cyanescens,* the Yoruba wild indigo or the indigo vine which is believed to produce the more durable dye. Other varieties are *indigofera sumatrana, indigofera anil, indigofera disperma, sesamum indicum, urenalobata, indigofera argentea*and *indigofera tinctora* which is the most commonly used because it produces a dark blue colour of great fastness. All these varieties of the indigo plant are generally and invariably called *elu* among the Yoruba.

Figure 1: Indigo Plant in Bloom in Ogbomoso, Oyo State, Nigeria
(Photograph by Gbemi Areo 2010)

The name 'indigo' is derived from *indicum*, which is a Latin word, implying "from India" (Biodun, 1995;32). This, however, does not indicate that the plant was introduced into Yorubaland from India or any other place outside the region. Indigo can be found abundantly in the wild all over Yorubaland. The combination of the climatic conditions and the fertile soil of tropical Yorubaland all make the region ideal for *indigofera* to grow naturally in the wild unlike in other cultures where the plant is cultivated. Scientifically, all the varieties of *indigofera* contain indican, a sugar and indigo compound known as "glucoside". On fermentation, glucoside releases indoxyl, which on exposure to air produces a combination of indigo red and indigo blue. The indigo red is obtained by slow oxidation in an acid medium, and the indigo blue by rapid oxidation in an alkali medium. Indigo is a substantive dye and hence requires no fixing agent or mordant. But the indigo, blue and insoluble in its natural form, is extracted in alkali medium into a soluble dye solution. Traditionally, in order to obtain this dye solution and the eventual indigo colour, the production of indigo dye among the Yoruba according Stanfield (1971), and Picton and Mack (1979) is in two parts, lengthy and tedious. The first part entails the breaking up of the young indigo leaves to encourage fermentation, while the second stage is the preparation of the ash or lye, the alkali medium which acts as the extracting agent that turns the insoluble indigo pigment in the leaves to soluble dye solution.

In point of fact however, these two stages are only the dye production stage. Achieving the deep rich indigo coloured fabric for which the Yoruba are renowned is obtained in four distinct stages. Apart from the two stages already

identified. There is the third stage, which is the extraction of the dye. There is also the forth and the last stage which is the dyeing of the fabric repeatedly in the dye vat before the deep indigo colour is achieved. These four stages are detailed below.

In the first stage which is the preparation of the indigo balls, the fresh young leaves of the *lonchocarpus cyanescens*, the Yoruba wild indigo, or the indigo vine *indigofera tinctoria* are collected. These young leaves are richer in colouring pigment, *indican*, and therefore give a darker indigo colour with better colour fastness. The *indican* is found as glucoside (C_{14} H_{17} O_8 N). The young leaves are pounded in big wooden mortar. The resultant pulp is molded into balls averagely about three inches in diameter or approximately the size of a lawn tennis ball, and left in the sun to dry for about three to five days. During this period, enzymic fermentation takes place and indoxyl and glucose are produced.

C_{14} H_{17} O_6 N + H_2 O - - - - - - - - - C_8H_7ON + C_6 H_{12} O_6 N

Indican Indoxyl Glucose

The second stage is the preparation of the ash or lye that extracts the dye from the indigo and makes it soluble. Before this ash could be prepared, a suitable kiln is made for its preparation. The kiln, cylindrical in shape, is made of thick mud walls and varies in size, but it is usually about four feet high and four feet wide. It is ensured that there is no crack on the walls, before each firing. About one foot to the top of this kiln, a mud shelf with holes in it is made. The purpose of the holes in the shelf is to allow flames reach the content on the kiln. An opening on the side of the kiln, close to the ground, allows the constant supply of logs of wood, usually of Parkia wood (*igi igba*) for the combustion of the kiln. The perforated shelf on the kiln is then loaded with short sticks of green wood of about a foot long and two inches thick. Other items include cocoa pods, palm fruit stock (Biodun, 1995;32), coconut fibre, millet stalks or indigo branches (Balfour, 2011;26). The collection of items burnt together to produce the ash and the quality of ash obtained vary from centre to centre and from dyer to dyer, but the aim in all the recipe is to obtain the best quality ash; the one richest in potassium carbonate content. After the one-foot length green sticks have been arranged on the perforated shelf of the kiln, layer by layer, old ashes from salt ash pots, and also ash from the house-cooking hearth are molded into tennis-sized balls with water from exhausted dye pot and added to the kiln, the ash balls piled on top looking like an ash cap on the kiln.

Figure 2: Ash Kiln (Drawing by Gbemi Areo)

The kiln, which is ready to be lit, is kindled by arranging kindling wood, palm kernel shells, and dry corn cobs to get the flames started. Long woods are then arranged on these kindling materials. The heat rising from this furnace to the green sticks produces steam and rises through the old ash balls, turning them glowing red. The fire burns all day for about ten to twelve hours (plate 3). The kiln is allowed to cool off during the night and the whole of the next day. The ash, which is collected on the third morning, is molded into balls with exhausted dye water.

Figure 4: A kiln with Wood Ash being Fired (Mack and Picton, 1979: 38.)

The best quality ash, called *eeru*, the Yoruba generic word for ash, is the one collected from the green sticks. It is moulded into balls and not mixed with the others. The ashes of the kindling logs are removed last and are of the lowest quality. These are moulded. The ash from grey ash balls on the kiln known as *ayunre* in Ibadan and as *labu* in Ede, are moulded separately. They are later broken up, sieved and stored in dry place for future use. The whole process of preparing the ash takes about three days, the first day for the preparation of the kiln, the second for the firing of the kiln, the third for the cooling down of the kiln and the collection of the ash.

The third stage is the preparation of the solvent solution from the prepared ash to extract the dye from the indigo balls turning it from its insoluble pigment state to a dye solution. This stage involves the use of two pots. The first pot has big opening in the side. The pot is dug into the ground to prevent it falling or rolling over. A second pot has an opening in its base and is placed on top of the first pot. Next the hole in the bottom of the upper pot is covered with a crisscross of small old dry sticks and discarded indigo fibres from dye pots. Good quality ash balls from the kiln are broken and mixed with ashes from the cooking hearth. These are placed on the sieve in the upper pot. Water is then poured on the ashes. This water percolates through the ashes in the upper pot, drawing with it into the lower pot, the lye or the alkaline solvent for indigo extraction. By tasting, the ash water is tested to confirm its readiness for use. The best quality alkaline water looks like weak urine and has a bitter taste (Asumawo, 2006). The water alkaline is collected from the lower pot through the hole on its side and poured into the dye pot inside which the indigo balls had earlier been broken. The number of indigo balls used depends on the intensity of colour required. Fifty indigo balls in a full pot of alkaline water produce a good blue, while one hundred and fifty balls will produce a very dark blue. The dyeing pots are not all of the same size. But the average pot size contains between 100 and 150 litres of the alkaline water. The dyers rely on their experience to balance between the quantities of indigo balls required to achieve the desired intensity of colour. The dye pot is stirred from time to time for about three days before dyeing commences.

Figure 5: Yoruba Dyers Filtering Alkaline Water through Broken up Ash Balls in Upper Pot into Lower Pot.in the 196os (Balfour-Paul, 2012: 106)

The dye is ready for use when blue scum starts to show on its surface. Beneath this blue scum must be a yellow green liquid. Its readiness is tested by dipping hand in the dye. If the solution is green and not red, rotten plantain is added as catalyst to speed up the reaction that will turn the liquid red. The solution is then tasted after some times. A 'sweet' taste signifies the dye's readiness for use (Sabitiyu, 2006).

Figure 6: The Indigo Solution with Blue scum on the Surface
Akoda Compound Ede. Photograph by Gbemi Areo, January 2007

The fourth and last stage in indigo dyeing involves dipping the fabric into the dye vat. After the indigo dye has been extracted, the cloth to be dyed is immersed in the dye and left for about three minutes on each dipping. The cloth, is coloured yellowish-green on being brought out of the pot and is placed on a board in order for excess dye to drain back into the pot. This yellowish green dye solution is a leuko related chemical product of indigo known as 'indigo white' which on contact with oxygen in the air turns blue; the yellowish-green having been oxidized to the permanent indigo blue colour. The cloth is dipped repeatedly and brought out to oxidize without it being rinsed at all. The cloth is allowed to drain, dried in the sun and re-dipped again. This process is repeated till the required shade of indigo is obtained. A very deep blue-black may require between thirty to forty dipping and drying (Eicher, 1976; 77). The cloth is thereafter beaten to obtain the peculiar high sheen for which new indigo-dyed cloth is known.

MYTH, TABOOS AND CHEMICAL REALITIES

Even with contemporary advancement in chemistry and dyeing process becoming more empirical and scientific, indigo is still considered one of the most difficult to use due to the unpredictability of its basic, essential organic ingredients. No wonder a renowned craftsman William Morris was reported to have written to a friend that "It would be a week's talk to tell you of the anxieties and possibilities connected with this indigo subject…" This anxiety is further buttressed by report on Nancy Stanfield's impressions based on her observation of the Yoruba indigo dyers in the 1950s; "a time filled with superstitions and a lot of stirring, sniffing, and sitting around waiting (Balfour, 2011; 116&119)." This probably explains why indigo dyeing is shrouded in mystery and secrecy in many dyeing culture with the Yoruba being no exception. In fact the myth concerning the origin of the Yoruba dyeing town Osogbo, popularly known as "*Ilu aro*", home of indigo dye is linked to certain deities involved in indigo dyeing in the area now known as Osogbo even before the forebears of the indigenes of the town settled there (Areo, 2013).

Indigo dyeing therefore is not left out of the deep religious expression and worldview of the Yoruba. Just as almost every of their indigenous activity has a patron deity, *IyaMapo*, a goddess, is linked with indigo dyeing and is the pan-Yoruba patron deity of women and all female arts and crafts. To the dyers, she was believed to be the first to engage in indigo dyeing. As a result of this, all dyers cease their dyeing activities every sixteenth day in order to venerate and offer sacrifices to her. Iya Mapo's attributes are rendered in various praise songs such as the ones cited below for example:

Iya Mapo Atiba (2ce)

Iya Mapo Atiba, iba re o, kiarooja

Oloyo, Iya Mapo, ohun to'se gb'esin

Iya Mapo oo fi ebi pa omo re ri (Jimoh, 2006).

Iya Mapo Atiba (2ce)

Iya Mapo Atiba, We reverence you, may the dye produce well.

The owner of Oyo, Iya Mapo, this is an activity that earned you the gift of a big horse.

Iya Mapo, you have never allowed your children to go hungry.

Another praise song is:

Iya Mapo, Iya awon Iya

Iya oni wa tutu aye

Lati ojo ti a ti wa aye lati orun

Ni Iya Mapo ti fi se le wa lowo

E npe se fun wa ju oja lo

E npe se fun wa ju oko lo (Beier, 1993;18).

Iya Mapo, mother of all mothers,

Calm old mother of the earth,

On the day we came down to the earth from heaven.

You gave us our profession,

You provide for us better than the market

You provide for us better even than the farm

While Wolff (Wolff, 2001;57) records that the sacrifice is offered annually, Odeyemi (2006;15), records that the worship and offering of sacrifices in Ede town is whenever the dyers are faced with challenges in the dyeing process or in the sale of their product. He further describes the ritual process. According to him, the items of worship and sacrifice are kolanuts*(obi),* bitter-cola *(orogbo),* white pigeon *(eyele funfun),* beans pudding (*ekuru),*and bean cake *(akara)*. The worship starts with a procession to the river led by an elderly woman with a white wrapper tied from her chest down to her ankle. She wears an elaborate hair-do and with her body painted with *osun,* cam wood. She is followed by a young virgin girl of about nine, dressed in a similar manner as the old woman, but carrying a white calabash containing the sacrificial items. This elderly woman splatters some indigo dye into the river, chanting:

Ki aro mi ko yo yooro

Iya, iya, ooo (3ce)

Iyaooo (Ajiboso, 2006).

Let my dye come out well

Oh mother, oh mother (3ce)

Mother!!!

Individual dyers also move to the river to say their prayers after the elderly woman might have completed hers. The dyers through this ritual activate a spiritual connectedness to *Iyamapo*, thereby consecrating their raw materials, the various techniques of pattern production and invariably the resultant cloth.

There are some taboos, according to Oke (1971;48), traditionally associated with indigo dyeing among the Yoruba. Failure of the dye to stay on the cloth is attributed to the presence of a pregnant woman. So, some leaves are placed over the dye pot during fermentation. This probably explains why women of child-bearing age are exempted from the art of indigo dyeing. Secondly, oranges must not be peeled near the dye pot. This, he adduces to the presence of acid in the oranges, which may interfere with the alkali medium of indigo extraction. Thirdly, it is a taboo for birds to move near the dye pots. This, he attributes to the uric acid present in their excretions, which may affect the alkaline medium of indigo dye.

Be that as it may, observance of the veneration of the patron deity of dyeing and the taboos associated with indigo dyeing is relatively born out of the traditional religious disposition of the Yoruba and their certain traditional knowledge of the chemistry and the technology of their artistic practice.

ADAPTATIONS IN CONTEMPORARY INDIGO DYEING

Not only is indigo dye one of the oldest dyes in the Yoruba artistic landscape, it remains perhaps the only natural dye being used by Yoruba dyers decades after their knowledge of and imbibing synthetic dyes. However, the preparation of indigo dye in recent times is being adapted to meet the demands of new technologies and materials. The dyers in Akoda town, for instance, now prepare their indigo dye using dry indigo leaves instead of indigo balls. The ash used as the alkali medium or lye has been replaced with industrial sodium hydroxide (caustic soda). Also the dyers add synthetic indigo to their dye vat. This shortens the time traditionally spent on the preparation, processing and production of the dye.

The synthetic indigo was first imported into West Africa shortly after World War II (1939-1945). Synthetic indigo, which was first launched into the market in 1897 by Badish Anilin Soda Fabric A.G.(BASF), was initially vehemently rejected by the Yoruba dyers who felt it was likely to fade and did not have the rich intensity of colour associated with natural indigo (plate 6). In order to convince the dyers, BASF had to add artificial malodorants to their synthetic indigo in order to simulate the natural indigo smell and further increase the appeal of their product to the dyers who were used to the peculiar indigo odour (Balfour, 2011). But on realizing the ease of its preparation, the dyers adopted it and started mixing this synthetic dye with the natural dye (Beier, 1993).

A noteworthy adaptation is also the substitution of clay pot used in dye extraction and dyeing with other types of pots. In the place of the ceramics vessel used traditionally in preparing indigo dye, most the few indigo dyers remaining in the few extant centres have resorted to using aluminum drums, the inside and or the outside of which are lined with cement plastering (plates 7 and 8). The reason for this change is not difficult to fathom. The relative durability of metallic containers over the relatively easily breakable pots is a serious factor. There is also the factor of decreasing number of

potters (Kalilu, 2006) who in relation to the diminishing number of dyers have stopped producing the giant dye pots of old. The potters' patronage is therefore presently limited to smaller wares used for domestic and ritual purposes (Kalilu; Akintonde and Ayodele, 2006). Metallic spoons such as aluminium spoons have also been introduced into the tools for indigo dyeing. These are used to measure caustic soda. In the latest practices, the indigo leaves are poured into a drum containing approximately 150 litres of water, synthetic indigo crystals are added and eight spoonfuls of Caustic Soda are also added. The dyers use locally made aluminum ladles as their measuring spoon.

Figure 7: Container of Synthetic Indigo Dye by BASF

Figure 8: Cement Plastered Metal Drum used for Dyeing in Abeokuta

Photograph by R. O. Rom Kalilu, July 2014

Figure 9: Cement Plastered Metal Drum being used for Dyeing in Ede

Photograph by Debo Areo, 2006

Figure 10: Aluminum Spoon for Measuring Caustic Soda at Akoda Compound, Ede.Photograph by Gbemi Areo, 2007

`On the spiritual level, with the conversion of most of the extant dyers to Islam and Christianity, the rituals traditional associated with indigo dye preparation and dyeing are no longer common. Furthermore, most of the extant dyers do not see the need for the taboo preventing women of childbearing age from indigo dyeing. On inquiry at the Akoda dyers lineage compound in Ede and Aka dyers lineage compound at Osogbo for example, the dyers indicated that they had at one time or the other passed through the childbearing phase successfully while practicing their dyeing. They also saw no need for the rituals of old and which they had discontinued.

CONCLUSIONS

The Yoruba dyers have continued through their dogged determination to keep indigo dye and dyeing alive in spite of numerous challenges from advancement in technology and the resultant industrial material products. The extant dyers have through their doggedness formed a connecting thread between the past, the present and the future of indigo dyeing in Yorubaland. They have also kept themselves economically responsible and contribute significantly to the socio-economic and technological development to their communities. It is nonetheless noteworthy that the ingenuity of the dyers is high. The Yoruba traditional dyers without formal Western education had over the generations depended solely on their traditional knowledge, natural physical senses of sight, touch, smell and taste to control the complex organic materials and chemical reactions of the indigo dye extraction as well as to determine the level of adaptations to technological changes required by their art to give empirically balanced products to the world.

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